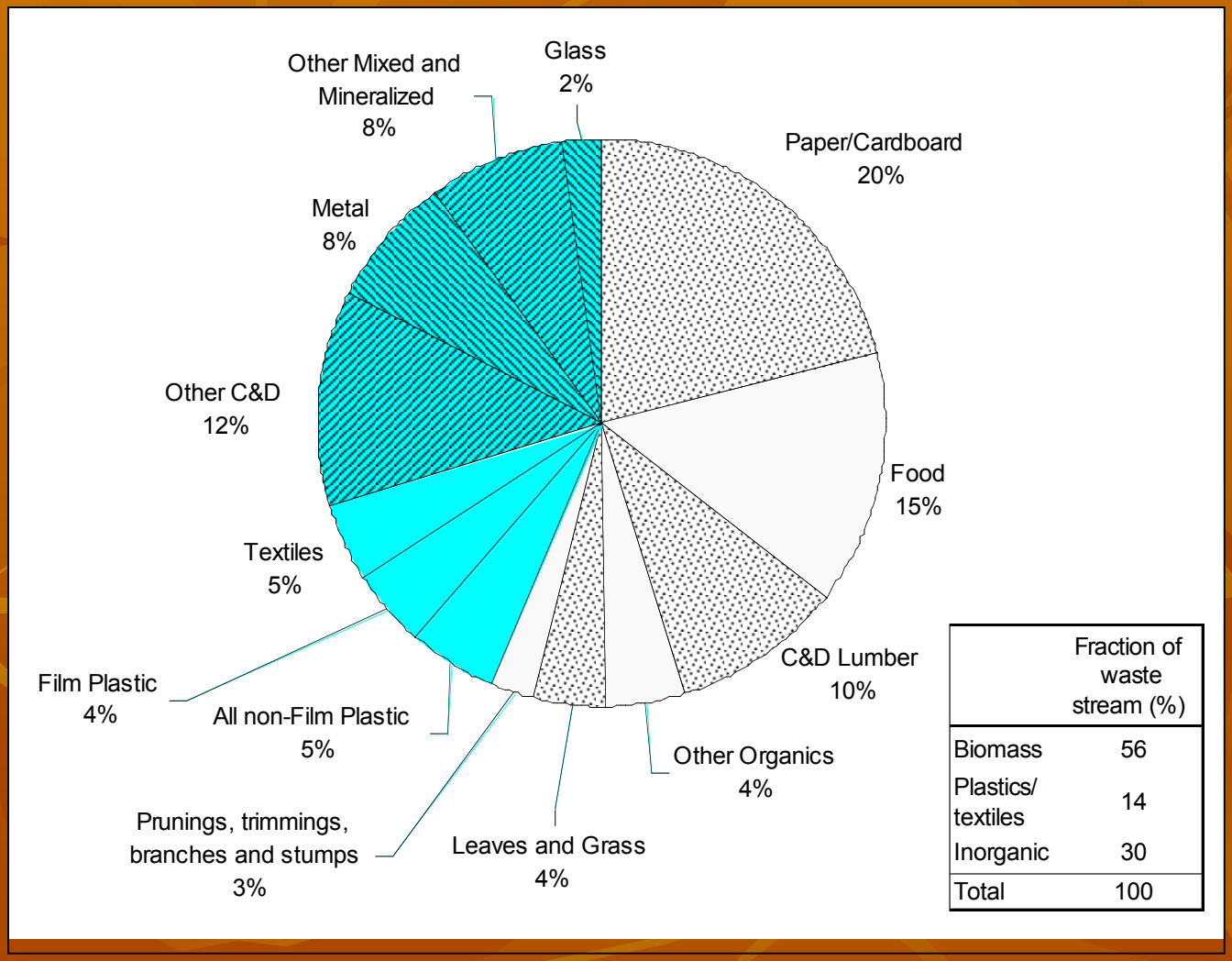
CIWMB Tasks

- Identify and quantify the amount of material currently being landfilled and assess biofuel potential.
- Establish goals for 2010 and beyond for the use of landfill-bound residuals.
- Identify state and private revenue sources of grant and incentive program research activities.
- Identify and quantify the potential of using landfill gas as a biofuel.

Amount and types of material landfilled



	Fraction of waste stream (%)
Biomass	56
Plastics/ textiles	14
Inorganic	30
Total	100

Source: Cascadia Consulting Group. (2004). "Statewide waste characterization study." Contractor's report to IWMB. Publication #340-04-005

Characterization and Potential Energy

	Landfilled *(million tons)*	Fraction of total chemical energy (%)	Oil equivalent *(million barrels)*	Electricity potential *(MWe)*
Paper/Cardboard	8.6	30	20.2	791
Food	6.0	6	3.7	204
Leaves and Grass	3.9	2	1.5	42
Prunings, trimmings, branches, stumps, and Green ADC	3.7	9	6.1	240
Other Organics	1.8	3	2.3	88
C&D Lumber	1.7	15	9.8	384
Biomass Components (Subtotal)	26	65	44	1750
All non-Film Plastic	2.1	10	6.8	264
Film Plastic	1.8	18	11.9	466
Textiles	1.8	7	4.7	184
Non-Biomass Organic Components (Subtotal)	6	35	23	914
Other C&D	4.9	–	–	–
Metal	3.1	–	–	–
Other Mixed and Mineralized	3.1	–	–	–
Glass	0.9	–	–	–
Inorganic Components (Subtotal)	12	–	–	–
TOTAL	44	100	67	2664

Source: Adapted from "***Biomass in Solid Waste in California, Utilization and Policy Alternatives***." Rob Williams, California Biomass Collaborative. Prepared under contract to California Energy Commission, Publication Number 500-01-016

Liquid Fuel Potential

Ethanol Scenario	Gross Biomass (million BDT)	Tech. Avail. Factor	Technical Annual amount (million BDT)	Ethanol yield (gal/dry ton)	Potential Ethanol (million gallons/y)	Potential Ethanol (million gallons gasoline equivalent)
Landfilled mixed paper/cardboard	7.9	0.5	3.97	70	278	185
Landfilled wood & green (+ ADC)	6.7	0.4	2.68	70	188	125
				Totals	**466**	**310**

-Alternative Scenario -

Conversion to Fischer-Tropsch Liquids (hydrocarbons)				FT Liquid yield (gal/dry ton)	(million gallons gasoline equivalent)
Landfilled mixed paper/cardboard	7.9	0.5	3.97	50	198
Landfilled wood & green (+ ADC)	6.7	0.4	2.68	50	134
				Total	**333**

Source: "*Biofuels from Municipal Wastes- Background Discussion Paper 28 March 2007*." Prepared by Robert B. Williams Department of Biological and Agricultural Engineering University of California, Davis and California Biomass Collaborative

Goals for Landfill-Bound Material

- By 2010, divert 10 percent of the biomass residuals and 20 percent of the non-biomass organic residuals
- By 2020, divert 40 percent of the biomass residuals and 60 percent of the non-biomass organic residuals

Revenue Sources

- Number of potential revenue sources from all sectors
- Examples include:
  - **Energy Foundation**: http://www.ef.org/home
  - **U.S. Department of Energy (DOE):**

    http://www.eere.energy.gov/inventions/energytechnet/funding/public_sector.html

    http://www.eere.energy.gov/inventions/energytechnet/funding/private_sector.html
  - Public Interest Energy Research Program
  - CalPERS Green Investment Program
  - SCAQMD Technology Advancement Program

Landfill Gas As A Biofuel

- Currently 366 landfills generating LFG
- Total landfill gas generated - Between 118 and 156 billion cubic feet per year (BCF/y)
- LFG to biofuels include:
  - Compressed Natural Gas
  - Liquid Natural Gas
  - Hydrogen
- Production of vehicle fuel from LFG negligible

Landfill As A Biofuel

- Compressed Natural Gas
  - County Sanitation Districts of Los Angeles
  - Sonoma County
- Liquid Natural Gas
  - Frank Bowerman Landfill – Orange County
  - Kiefer Landfill – Sacramento County
  - Altamont Landfill – Alameda County
- Hydrogen
  - CIWMB funded study

CIWMB Strategic Policy Committee

- Scheduled for July 10th
- Biofuels Discussion
  - On The Road: Current Activities
  - Road Blocks: Challenges to Biofuels Implementation
  - The Road Ahead
- Committee Discussion